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ABSTRACT

Reported are the results of a 1975 biennial survey of the occupational status of doctorate-holding scientists and engineers in the United States. The data are presented with comparisons of data from the 1973 survey. Major findings include: the population of doctoral scientists and engineers grew 13% from 1973 to 1975; the number of women holding Ph.D.'s grew 23%; unemployment rate for doctoral scientists and engineers was less than 1% in 1975; the number of employed doctoral scientists and engineers grew by 16%, with a 32% increase within industry; and the number of doctoral scientists and engineers receiving federal support declined 46%. (SL)

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nsf SCIENCE RESOURCES STUDIES HIGHLIGHTS

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Largest Increase in Employment of Doctoral Scientists and Engineers is in Industrial Sector: 1973-75

In 1973 and 1975 manpower surveys of the doctorate-holding scientists and engineers in the United States were conducted for the National Science Foundation and the National Institutes of Health by the National Research Council of the National Academy of Sciences. The population surveyed consisted of individuals in the United States who held science or engineering (S/E) doctorates, or who had received doctorates in non-S/E areas but were employed in S/E positions. The 1973 survey took account of individuals who had received their doctorates between January 1, 1930 and June 30, 1972, inclusive; for the 1975 survey, this population was modified to include fiscal year 1973 and fiscal year 1974 cohorts, while the 1930 and 1931 cohorts were dropped. Both surveys were based on stratified samples of approximately 60,000 individuals; response rates of the sample members contacted in 1973 and 1975 were 79.0 percent and 74.6 percent, respectively.

The 1975 data contained in this report present the earliest results of the second in this biennial series of surveys; the 1973 data are presented for comparative purposes. Comprehensive results of the 1973 survey may be found in reports previously published.[1]

- The population of doctoral scientists and engineers grew from 245,000 in 1973 to 278,000 in 1975—a 13-percent increase. During this period, the number of women holding Ph.D.'s in science and engineering increased at a faster rate (23 percent) than men (12 percent).
- The unemployment rate for doctoral scientists and engineers, which was 1.2 percent in 1973, was just under 1 percent in 1975.
- Between 1973 and 1975, the number of employed doctoral scientists and engineers increased by 16 percent. The most significant change in the employment pattern occurred in industry, where the number employed grew from 50,000 to 66,000, an increase of 32 percent.
- The proportion of employed doctoral scientists and engineers receiving Federal support in their work decreased from 46 percent in 1973 to 43 percent in 1975. This decrease is consistent with the pattern of Federal funding in support of R&D during this period, which has not kept pace with the growth in the number of employed scientists and engineers holding a Ph.D.

Demographic Characteristics

In 1975 the population of doctoral scientists and engineers in the United States numbered about 278,000—a 13-percent increase from 1973. During this 2-year period, the relative increase in the number of women doctorate-holders in science and engineering exceeded that of men. Thus, while the number of men increased by 12 percent, the increase among women was almost twice that level (23 percent). As a result, the proportion of women in the doctorate-holding S/E population rose from 8.7 percent in 1973 to 9.4 percent in 1975.

In 1975 over two-fifths of the doctoral scientists and engineers in the United States were between 30 and 39 years of age and about three-fifths were under age 45. The preponderance of younger individuals in this segment of the Nation's population is underscored by the fact that every group starting at age 30-34 is larger than the next older group. The small number of doctorate-holders under age 30 may result from delays in entering a doctoral program in addition to the lengthy period required to earn a Ph.D. (chart 1).

The 1975 distribution of doctoral scientists and engineers, by age, showed only slight differences from that in 1973. Although the influx of new doctorate-holders from the 1973 and 1974 graduating classes accounted for a sizable increase in the total population of Ph.D. scientists and engineers during the 2-year period from 1973 to 1975, the overall median age dropped by only 1 year; from 42 in 1973 to 41 in 1975. In other respects, however, the age patterns in 1975 were very similar to those in 1973.

[1] National Science Foundation, *Characteristics of Doctoral Scientists and Engineers in the United States, 1973* (NSF 75-312), 1975; *Reviews of Data on Science Resources*, No. 24, "Work Activities of Employed Doctoral Scientists and Engineers in the U.S. Labor Force, July 1973" (NSF 75-310), June 1975; *Reviews of Data on Science Resources*, No. 25, "Doctoral Scientists and Engineers in Private Industry, 1973" (NSF 76-302), April 1976 (Washington, D.C. 20402: Supt. of Documents, U.S. Government Printing Office); *Detailed Statistical Tables, Characteristics of Doctoral Scientists and Engineers in the United States, 1973* (NSF 75-312-A) (Washington, D.C. 20550), 1975; and National Academy of Sciences, *Doctoral Scientists and Engineers in the United States: 1973 Profile* (Washington, D.C., March 1974).

Prepared in the Manpower Characteristics Studies Group, Division of Science Resources Studies

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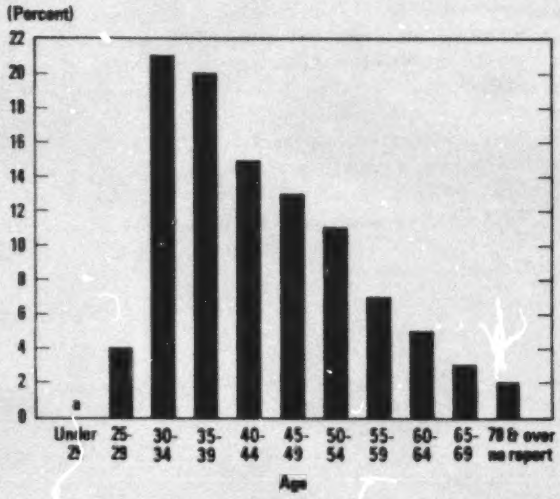
CHART 1. Doctoral scientists and engineers by age: 1975



[a]Less than 0.5 percent

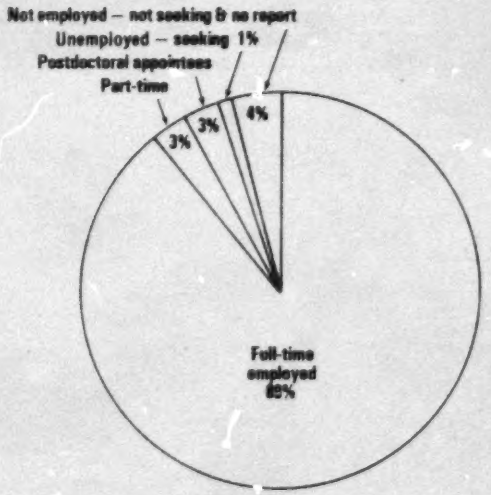
SOURCE: National Science Foundation

Employment Status

In 1975 there were approximately 265,000 doctoral scientists and engineers in the labor force, a 15-percent increase from 1973. Of this number, about 2,500 were unemployed and seeking employment. The unemployment rate was slightly less than 1 percent, as compared with an unemployment rate of 1.2 percent in 1973.

In 1975, about 90 percent of the population of doctoral scientists and engineers reported full-time employment

CHART 2. Employment status of doctoral scientists and engineers: 1975



SOURCE: National Science Foundation

Characteristics of doctoral scientists and engineers in the United States: 1973 and 1975

Characteristics	1973 Number	1973 Percent	1975 Number	1975 Percent
Total	244,921	100.0	277,517	100.0
Sex				
Men	223,660	91.3	251,399	90.6
Women	21,261	8.7	26,118	9.4
Age				
24 or under	12	(1)	30	(1)
25-29	10,679	4.4	10,026	3.6
30-34	54,023	22.1	58,168	21.0
35-39	45,329	18.5	56,229	20.3
40-44	37,913	15.5	42,004	15.1
45-49	31,767	13.0	35,233	12.7
50-54	25,576	10.4	29,921	10.8
55-59	16,849	6.9	19,452	7.0
60-65	10,240	4.2	12,754	4.6
65-69	7,321	3.0	7,804	2.8
70 or over & no report	5,212	2.1	5,896	2.1
Employment Status				
Full-time employed	213,611	87.2	246,624	88.9
Science/engineering	202,432	82.7	233,550	84.2
Nonscience/engineering	11,179	4.6	13,074	4.7
Part-time employed	7,180	2.9	7,439	2.7
Science/engineering	6,420	2.6	6,522	2.4
Nonscience/engineering	760	.3	917	.3
Postdoctoral appointees	5,959	2.4	8,348	3.0
Unemployed, seeking	2,642	1.1	2,533	.9
Not employed, not seeking	1,477	.6	2,425	.9
Retired and not employed	6,266	2.6	9,205	3.3
Other	2,381	1.0	447	.2
No report	5,405	2.2	496	.2
Type of Employer				
Business/industry	50,022	20.4	65,876	23.7
Educational institutions	132,692	54.2	153,249	55.2
4-year colleges/univ	128,095	52.3	147,633	53.2
2-year colleges	3,061	1.2	3,674	1.3
Elementary/secondary schools	1,536	.6	1,942	.7
Hospital/clinics	5,714	2.3	7,586	2.7
Nonprofit organizations	7,853	3.2	8,510	3.1
Federal Government	17,640	7.2	19,452	7.0
Military/Commissioned Corps	1,984	.8	2,182	.8
State Government	2,597	1.1	3,110	1.1
Other government	1,322	.5	2,011	.7
Other	3,390	1.4	86	(1)
Not employed	18,171	7.4	15,106	5.4
No report	3,536	1.4	349	.1
Primary Work Activity				
Research & development	69,509	28.4	84,510	30.5
Basic research	32,275	13.2	39,121	14.1
Applied research	28,654	11.7	33,779	12.2
Development	8,580	3.5	11,610	4.2
Management or administration	40,408	16.5	52,838	19.0
Of R&D	22,529	9.2	29,286	10.6
Other than R&D	12,097	4.9	16,023	5.8
Of both	5,782	2.4	7,529	2.7
Teaching	81,728	33.4	93,665	33.8
Consulting	4,014	1.6	5,655	2.0
Sales/professional services	8,242	3.4	11,824	4.3
Other	6,939	2.8	7,691	2.8
Not employed	18,171	7.4	15,106	5.4
No report	15,910	6.5	6,225	2.2
Federal Support Status				
Receiving support	104,258	42.6	112,969	40.7
No support	113,011	46.1	140,250	50.5
Status unknown	6,864	2.8	6,809	2.5
Not employed	18,171	7.4	15,106	5.4
No report	2,617	1.1	2,383	.9

[1] Less than 0.1 percent.

NOTE: Percents may not add to 100 because of rounding.

SOURCE: National Science Foundation.

status while 3 percent held part-time jobs. An additional 3 percent held postdoctoral appointments[2] while the balance were unemployed, outside the labor force, or gave no report of their employment status. The labor force participation rate was 95 percent (chart 2).

In addition to a very slight reduction in the unemployment rate of doctoral scientists and engineers, other changes which took place between 1973 and 1975 were increases in the proportion of full-time employed individuals and postdoctoral appointees, accounted for principally, by a decrease in the no report category.

Type of Employer

In 1975 the employed labor force of doctoral scientists and engineers numbered about 262,000. As in 1973, educational institutions continued to provide the largest source of employment; business and industry and the Federal Government were the largest sources of nonacademic employment. The remaining individuals were distributed more or less evenly among other employers (chart 3).

Between 1973 and 1975, several changes took place in the pattern of employment of doctoral scientists and engineers. Most notable among such changes was an increase in employment within the business and industry sector of the economy. In 1973, 22.1 percent of the total stock of employed doctoral scientists and engineers were so employed; by 1975 this proportion had increased to 25.1 percent. This net increase of 3 percentage points, although modest, is of particular significance in light of recent studies which have projected a shift of employment to nonacademic settings.[3]

Changes in the employment patterns of doctoral scientists and engineers within other sectors were less significant. Small increases were noted in the proportion of individuals employed by hospitals/clinics and by State and local governments while similarly small declines were noted in the proportions employed by educational institutions, nonprofit organizations, and the Federal Government including the military establishments and the Commissioned Corps. Shifts from the other and no report categories, however, accounted principally for the net increase in industry.

Work Activity

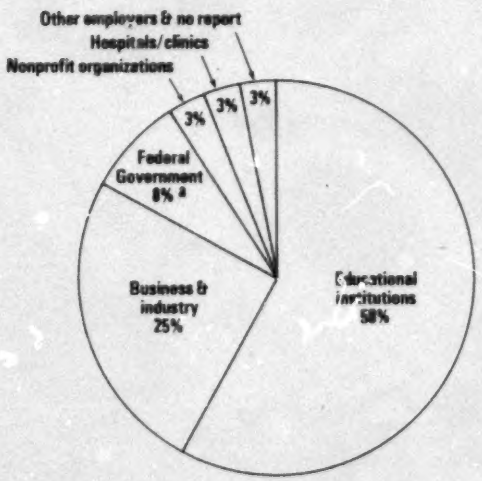
In 1975 teaching was the primary work activity of more than one-third of the doctoral scientists and engineers in the employed labor force. Slightly less than one-third were engaged in the performance of research and development, while about one-fifth were engaged in managerial activities (chart 4).

Between 1973 and 1975 several minor changes were noted in the pattern of work activities of employed doctoral scientists and engineers. In this 2-year period, increases were noted in the proportion of individuals engaged in research and development, management, consulting, and sales/professional services, while teaching and other activities showed a slight decline. Activity categories showing increases in 1975, however, were accounted for principally by a substantial decrease in the proportion of individuals giving no report of their work activities.

[2] Additional postdoctoral appointments held by professional, medical, and foreign doctorate-holding personnel are outside the scope of this report.

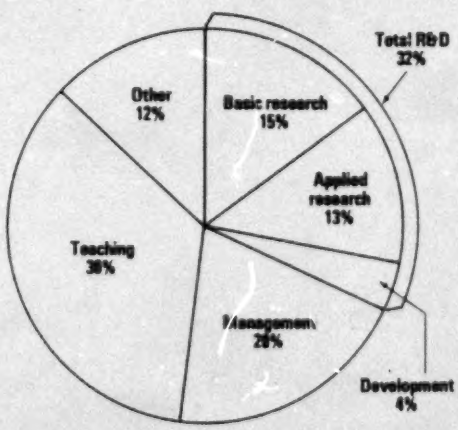
[3] National Science Foundation, *Reviews of Data on Science Resources*, No. 25 *op. cit.* and *Projections of Science and Engineering Doctorate Supply and Utilization, 1980 and 1985* (NSF 75-301) (Washington, D.C. 20402: Supt. of Documents, U.S. Government Printing Office, 1975).

CHART 3. Employed doctoral scientists and engineers by type of employer: 1975



[a]Includes military and Commissioned Corps
SOURCE: National Science Foundation

CHART 4. Doctoral scientists and engineers by primary work activity: 1975



SOURCE: National Science Foundation

Federal Support Status

In 1975, 43 percent of the employed doctoral scientists and engineers in the United States received Federal support for thier work; this proportion signified a decrease of 3 percentage points from the 46-percent level reported in 1973. This change can be related to the pattern of Federal funding during the 2-year period, which has not kept pace with the growth in the number of doctoral scientists and engineers. Thus, from fiscal year 1973 to fiscal year 1975, Federal funds for the performance of research and development by the universities and industrial sectors of the economy[4] *decreased* by about 7 percent[5] (in constant 1972 dollars[6]) while the number of doctoral scientists and engineers employed in these sectors grew by 20 percent.

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[4] In 1975, 84 percent of all employed doctoral scientists and engineers were employed in these two sectors.

[5] National Science Foundation, *Detailed Statistical Tables, Federal Funds for Research Development and Other Scientific Activities, Fiscal Years 1975, 1976, and 1977*, Vol. XXV, (NSF 76-315) (Washington, D.C. 20550, July 1976.) These are obtainable gratis on request to NSF.

[6] Based on GNP implicit price deflator.

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